Read,
Understand
& try

$$\lim_{x \to \infty} \frac{6x^2 - 3x + 7}{5x^2 - 1}$$

J.

Start with $\lim_{x \to \infty} \dfrac{x^2 + 3x + 6}{2x^2 + 1}$

Determine the largest degree term: x^2

Divide every term by it: $\lim_{x \to \infty} \dfrac{\frac{x^2}{x^2} + \frac{3x}{x^2} + \frac{6}{x^2}}{\frac{2x^2}{x^2} + \frac{1}{x^2}}$

Simplify:

$$\lim_{x \to \infty} \frac{1 + \frac{3}{x} + \frac{6}{x^2}}{2 + \frac{1}{x^2}}$$

Look at each term individually

$1 \to$ doesn't change $\quad \frac{3}{x} \to \frac{3}{\infty}$ or $\frac{3}{BIG} = 0 \quad \frac{6}{x^2} \to \frac{6}{\infty^2}$ or $\frac{6}{BIG^2} = 0$

$2 \to$ doesn't change $\quad \frac{1}{x^2} \to \frac{1}{\infty^2}$ or $\frac{1}{BIG^2} = 0$

Re-write

$$\lim_{x \to \infty} \frac{1 + \frac{3}{x} + \frac{6}{x^2}}{2 + \frac{1}{x^2}}$$

$$= \frac{1 + 0 + 0}{2 + 0}$$

$$= \frac{1}{2}$$

$$\therefore \lim_{x \to \infty} \frac{x^2 + 3x + 6}{2x^2 + 1} = 1/2$$

H.

Given:

$\lim_{x \to 0} \left(f(x) + g(x) \right) = 1$ and $\lim_{x \to 0} \left(f(x) - g(x) \right) = 2$

Find:

1.) $\lim_{x \to 0} f(x)$

2.) $\lim_{x \to 0} g(x)$

G.

EXPONENTS

1.) $\dfrac{x^2 \cdot x^5}{x^{-6}}$

2.) $\dfrac{3x^2 \cdot x^7}{x^{11}}$

3.) $\dfrac{9x^3 \cdot 2x^4}{3x^2}$

4.) $\dfrac{(3x^2)^2 \cdot 2x^3}{(4x^2)^2}$

5.) $\dfrac{7x^5 \cdot 5x^7}{(-5x)^{-2}}$

6.) $\dfrac{[4x^2 \cdot 3x^7]^0}{-1}$ 1

7.) $\dfrac{x^{1/2} \cdot x^{1/3} \cdot x^{1/6}}{(3x^2+7x)^0}$ 1 $= x^{\frac{1}{2}+\frac{1}{3}+\frac{1}{6}}$

$x^{\frac{6}{6}}$

$\boxed{x}$

8.) $\dfrac{2x^3 \cdot 4x^5}{(8x^9)^{1/3}}$

ANSWER AND EXPLAIN

F.

Rationalize the denominators

1.) $\dfrac{1}{\sqrt{x} - 3}$

2.) $\dfrac{3}{4\sqrt{x} + 7}$

3.) $\dfrac{2\sqrt{3} + 1}{2\sqrt{3} - 1}$

4.) $\dfrac{2\sqrt{x} - 1}{2\sqrt{x} - 3}$

5.) $\dfrac{4\sqrt{3} + 2\sqrt{7}}{5\sqrt{3} + 6\sqrt{7}}$

6.) $\dfrac{-7\sqrt{5} + \sqrt{7}}{\sqrt{x} + 1}$

7.) $\dfrac{5\sqrt{3} + 2\sqrt{7}}{5\sqrt{3} - 2\sqrt{7}}$

8.) $\dfrac{6\sqrt{x} - 3\sqrt{y}}{6\sqrt{x} + 3\sqrt{y}}$

ANSWER

AND

EXPLAIN.

I.

∞ or $-\infty$?

Fill in the following:

$1 \div 0.001 =$ ______

$1 \div 0.0001 =$ ______

$1 \div 0.00001 =$ ______

$1 \div 0.000001 =$ ______

$1 \div 0.0000001 =$ ______

As we divide by smaller numbers, our answer becomes ______

$\frac{-1}{10} =$

$\frac{-1}{1000} =$

$\frac{-1}{100000} =$

$\frac{-1}{10000000} =$

$\frac{-1}{1000000000} =$

As we divide by larger numbers, our answer becomes ______

D.

Relationships! How are distance, velocity, acceleration related to each other?

If position (distance) is given by $f(x) = 2x^3 - 7x$, find the acceleration.

If acceleration is given by $a(x) = 2x$, can you find the velocity.

C.

Given: $\lim_{x \to 0} f(x) = 4$ $\quad \lim_{x \to 0} g(x) = 5$ $\quad \lim_{x \to 0} h(x) = 1$

Evaluate:

a.) $\lim_{x \to 0} \frac{f(x)}{g(x)} + \lim_{x \to 0} \frac{h(x)}{g(x)f(x)}$

b.) $\lim_{x \to 0} [f(x)]^3 + \lim_{x \to 0} \frac{h(x)}{g(x)}$

c.) $\lim_{x \to 0} 3 + \lim_{x \to 0} f(x)g(x)$

d.) $\lim_{x \to 0} [f(x) + g(x)] + \lim_{x \to 0} [g(x) - h(x)]$

E.

Fractions

1.) $\frac{1}{3} + \frac{2}{7}$

2.) $\frac{4}{7} \div \frac{9}{5}$

3.) $\frac{x}{5} + \frac{2}{x}$

4.) $\frac{x}{6} \div \frac{7}{x}$

5) $\frac{4}{7} - \frac{9}{13}$

6) $\frac{1}{x} + \frac{1}{y}$

7.) $\dfrac{\frac{1}{x} + \frac{1}{y}}{2}$

8) $\dfrac{\frac{1}{x} + \frac{1}{y}}{\frac{1}{3} + \frac{2}{5}}$

9.) $\dfrac{\frac{3}{x} + \frac{2}{y}}{\frac{3}{x} - 1}$

10.) $\dfrac{\frac{5}{x} - \frac{4}{y}}{\frac{3}{x-3}}$

* YOU'RE TO ANSWER AND EXPLAIN TO A PARTNER HOW TO DO THESE QUESTIONS

Draw 3 graphs that meet the following criteria:

$f(1) = 9$

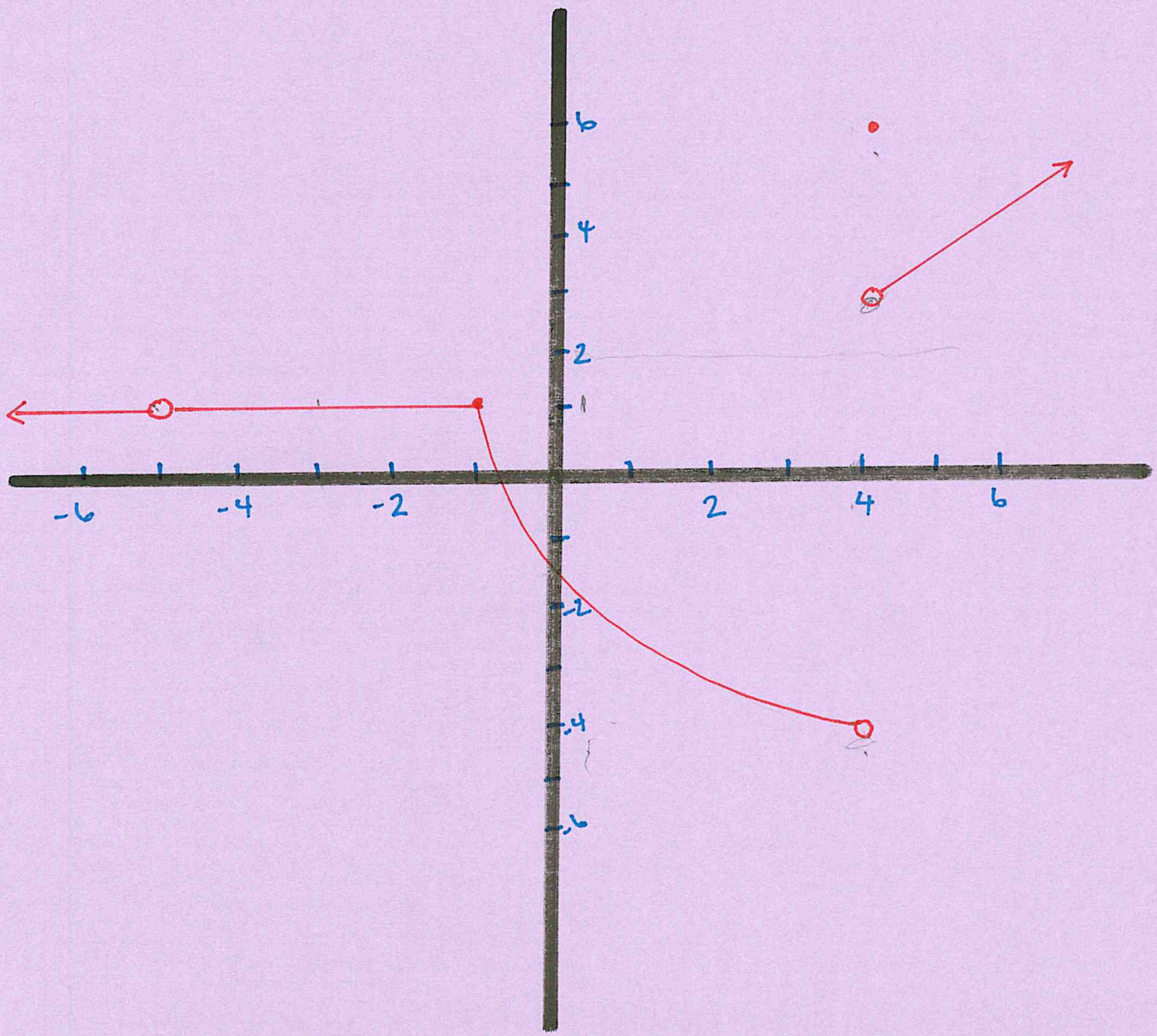
Continuous function

$\lim_{x \to -5} f(x) = 9$

$\lim_{x \to -1} f(x) = 3$

A.

B.



State:

$\lim_{x \to -5} f(x)$

$\lim_{x \to -1} f(x)$

$\lim_{x \to 4^+} f(x)$

$\lim_{x \to 4^-} f(x)$

$\lim_{x \to 4} f(x)$

$\lim_{x \to 0} f(x)$

$\lim_{x \to -3} f(x)$